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(19) (CA) **CANADIAN PATENT** (12)

(54) Disposable Diaper with Elastic Gather Having Branch  
Portions Diverged Therefrom

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(30) (JP) Japan 62-223780 1987/09/07

(57) 17 Claims

Canada

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~~DISPOSABLE DIAPER~~

BACKGROUND OF THE INVENTION

The present invention relates to absorbent articles such as disposable diapers, and more particularly, to absorbent articles having an improved sealing means around the leg and/or waist of the wearer.

U.S. Patent No. 4,695,278 to Lawson discloses absorbent articles having dual cuffs for leg sealing. The sealing means of the patent comprises an elastically contractible gasketing cuff that extends outwardly relative to a center line of the article and a barrier cuff disposed inboard of the gasketing cuff. The barrier cuff is provided with elastic means that spaces a distal end thereof away from a topsurface of the article to form a pocket within which body exudates are contained.

However, when the diaper is applied to a user, the gasketing cuff is folded backward to encircle thighs of the user which in turn causes the barrier cuff to be folded inwardly and spaced away from the thighs because the both cuffs have the same base line, that is, a proximal edge of the barrier cuff. Movement of the user's thighs causes the barrier cuff to be stretched and folded further inwardly in the result the barrier cuff rides on the topsurface so that the body exudates flow beyond the barrier cuff.



Therefore, it is a main object of the present invention to provide an absorbent article with the improved liquid containment characteristics.

#### SUMMARY OF THE INVENTION

In accordance with one aspect of the present invention, an absorbent article such as a disposable diaper is provided with a liquid permeable topsheet, a liquid impermeable backsheet, an absorbent core interposed between the topsheet and the backsheet and a pair of elastic gathers extending along the at least respective sides of the absorbent core. The elastic gather comprises a pair of elasticized branch portions diverging inwardly and outwardly, respectively, from a leg portion which joins the branch portions to the article.

When the diaper is applied to the user, the both branch portions turn outwardly with the outward movement of the leg portion to encircle the user's thigh. A pocket is formed between the inner branch portion and the leg portion within which liquid is contained and held effectively.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a plan view of a disposable diaper embodiment of the present invention having cut-away portion;

Fig. 2 is a section taken along a line 2 - 2 in Fig. 1;

Figs. 3 and 4 are sections of alternative embodiments, respectively;

Fig. 5 is a partial perspective view of the diaper;

Figs. 6 through 10 are sections of alternative elastic gather embodiments, respectively;

Fig. 11 is a plan view of a disposable diaper embodiment showing a curved inner branch portion; and

Fig. 12 is a perspective view of the diaper as shown in Fig. 11.

#### PREFERRED EMBODIMENTS OF THE INVENTION

In Figs. 1 through 12, there are shown preferred embodiments of the present invention as applied to a disposable diaper.

Referring to Fig. 1, the disposable diaper comprises a liquid permeable topsheet 1, a liquid impermeable backsheet 2, an absorbent core 3 interposed between the topsheet 1 and the backsheet 2, waist flaps 4 and side flaps 5 respectively extending outwardly from longitudinal and lateral edges of the absorbent core 3. An adhesive fastening tape 6 is applied to each lateral end of the backwaist flap 4. As shown in Fig. 2, the diaper also includes a pair of elastic leg gathers 7 disposed on and extending longitudinally of the side flaps 5.

Each elastic gather 7 includes an outer covering sleeve

and an elastic element 11. The elastic element 11 is positioned within the covering sleeve to define a pair of elasticized inner and outer branch portions 9, 10 which diverge inwardly and outwardly, respectively, from a leg portion 8 which joins the branch portions 9, 10 to the side flap 5. The covering sleeve depends from the elastic element 11 to form the leg portion 8. The elastic element 11 may be disposed at least in a crotch region.

The inner branch portion 9 and/or the outer branch portion 10 has its longitudinal ends at least one of which is preferably secured to the side flap 5 as exemplarily illustrated in Figs. 1 and 5.

In Fig. 1 each longitudinal end of the inner branch portion 9 is at its portion 12 secured to the side flap 5 and the longitudinal ends of both inner and outer branch portions 9, 10 are shown to be secured to the side flap 5 in Fig. 5. The other variations in such end securements may be considered to be suitable.

While the respective widths of the inner and outer branch portions 9, 10 that diverge from the leg portion 8 may be equally dimensioned as shown in Fig. 2, either branch portion may also be dimensioned narrower or wider than the other branch portion, such as generally illustrated in Figs. 3 and 4.

Although not illustrated, a pair of elastic elements

can be positioned within the covering sleeve such that each of the elastic elements respectively defines one of the inner and outer branch portions 9, 10 of the elastic gather 7.

Figs. 6 through 8 show alternative embodiments of the elastic gather 7 wherein the covering sleeve comprises two covering sheets each enclosing at least one elastic element to respectively define the inner and outer branch portions 9, 10.

In Fig. 6, respective covering sheet is equally folded onto itself with a flat elastic element 11 securedly enclosed therein and respective portions depending from the elastic element are secured together to form the leg portion 8 which is joined to the side flap 5.

In Fig. 7, a leading edge of each covering sheet is folded onto itself to form a tunnel within which an elastic strand 11 is enclosed. The respective elastic strands 11 are positioned substantially parallel relative to each other.

A plurality of elastic strands 11 may be positioned within the tunnel as shown in Fig. 8.

In Fig. 9, a T-shaped covering sleeve includes an downwardly curved elastic element 11 to form inner and outer branch portions 9, 10. The covering sleeve depending from the elastic element 11 defines the leg portion 8. The covering

sleeve includes a further extension from the leg portion 8 which defines a base portion 13 secured to the backsheet 2 such that the topsheet 1 stops underneath the leg portion 8.

In another embodiment, one cover sheet develops an elastic element and depends therefrom to define a leg portion which is joined to the side flap. Another cover sheet which also develops an elastic element is secured to the leg portion to define the inner and outer elasticized branch portions.

When two cover sheets are employed, material of each cover sheet would be suitably selected.

In the foregoing embodiments, there is formed a base portion 13 which is a portion of the covering sleeve joined to the side flap 5. While either terminal edge of the base portion 13 is illustrated in Figures as directing outwardly, the base portion 13 can be positioned such that the terminal edge directs inwardly toward the absorbent core 3.

In Fig. 10, the base portion 13 is secured between the absorbent core 3 and the backsheet 2.

When such elastic gather 7 is arranged in the crotch region of the diaper, the inner branch portion 9 and the leg portion 8 together form a pocket 14 within which body exudates are contained and held.

In Figs. 11 and 12, the inner branch portion 9 is curved relative to a centerline to have a wider width at respective

ends than at a central portion thereof and an elastic strand 11a is positioned along the curved edge. A relatively wide and rectilinear polyurethane elastic foam 11b is disposed within the outer branch portion 10. The similar elastic foam 15 is positioned in respective front and back waist flaps 4 to form a waist elastic gather.

The topsheet 1 may be of fibrous nonwoven fabric, porous plastic film etc, and the backsheet 2 may be of liquid-impermeable plastic film, laminate sheet consisting of preferably moisture-permeable plastic film and fibrous nonwoven fabric. The absorbent body 3 may be, for example, of mat-like body consisting of fluff pulp mixed with super absorbent polymer particles, covered at least on upper and lower sides with liquid-permeable sheets such as tissue paper.

The covering sleeve may be preferably made of flexible and moisture-permeable material. However, such moisture-permeability of the covering sleeve can be partly provided to at least either one of inner and outer branch portions and a leg portion. Examples of the moisture-permeable material are micro-porous plastic film, fibrous nonwoven fabric treated to be hydrophobic, and laminate sheet thereof.

The elastic element 11 may comprise natural or synthetic rubber, polyurethane foams, any heat shrinkable



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elastic material or other wide variety of materials as well known in the art.

While the particular elastic gather embodiments of the present invention have been illustrated and described as applied to a crotch section, it should be understood that such elastic gather can be applied to the waist flap of the diaper for providing an elastic waist gather.

Furthermore, additional elastic means can be disposed in the flap outwardly of the elastic gather.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A disposable diaper comprising:

a liquid permeable top sheet;

a liquid impermeable back sheet associated with said top sheet;

an absorbent body interposed between said top sheet and said back sheet; and

a pair of elastic leg gathers extending longitudinally of said diaper on respective sides of said absorbent body, each elastic leg gather comprising a pair of elasticized branch portions diverging inwardly and outwardly, respectively, from a leg portion which joins said branch portions to at least one of said top sheet and said back sheet, each of said branch portions being spaced from said top sheet such that at least one pocket is provided inwardly of each elastic gather for enhanced containments of waste within said diaper.

2. A disposable diaper according to Claim 1 wherein each elastic leg gather includes at least one elastic element and an outer covering sleeve, said elastic element being positioned within said sleeve to generally define the inner and outer branch portions of each elastic leg gather, said covering sleeve depending from said elastic element to provide said leg portion of each elastic leg gather.

3. A disposable diaper according to Claim 2 wherein said covering sleeve and said leg portion are formed from

the same material.

4. A disposable diaper according to Claim 1 wherein each elastic leg gather includes a pair of elastic elements and an outer covering sleeve, said elastic elements being positioned within said sleeve such that each of said elastic elements respectively defines one of said inner and outer branch portions of said elastic gather, said covering sleeve depending from said pair of elastic elements to provide said leg portion of said elastic gather.

5. A disposable diaper according to Claim 4 wherein said pair of elastic elements is arranged substantially parallel relative to each other.

6. A disposable diaper according to Claim 4 wherein the elastic element within said inward branch portion is curvilinear and the elastic element within said outward branch portion is rectilinear.

7. A disposable diaper according to Claim 6 wherein said elastic element within said inward branch portion is an elastic strand.

8. A disposable diaper according to Claim 4 wherein said covering sleeve and said leg portion are formed from the same material.

9. A disposable diaper according to Claim 4 wherein said outer covering sleeve comprises a substantially liquid impermeable, air permeable nonwoven fabric material for

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containing body waste within said diaper while permitting air circulation into said diaper through said elastic gathers.

10. A disposable diaper according to Claim 2 wherein at least one of said elastic elements comprises polyurethane elastic foam material.

11. A disposable diaper according to Claim 4 wherein each of said pair of elastic elements comprises polyurethane elastic foam material.

12. A disposable diaper comprising:

a liquid permeable top sheet;

a liquid impermeable back sheet associated with said top sheet;

an absorbent body interposed between said top sheet and said back sheet; and

a pair of elastic leg gathers extending longitudinally of said diaper on respective sides of said absorbent body, each leg gather including a pair of elasticized branch portions diverging inwardly and outwardly, respectively, from a leg portion which joins said branch portions to at least one of said top sheet and said back sheet wherein the one branch portion of each leg gather is a member to provide a force upwardly lifting said leg portion when said diaper is fitted to a wearer and the inner one of said branch portions is a member to form a pocket for containment of body waste in conjunction with said leg portion and said side flap.

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13. A disposable diaper according to Claim 12 wherein each leg gather includes a pair of elastic elements and an outer covering sleeve, said elastic elements being positioned within said sleeve such that one of said elastic elements defines one of said branch portions and the other elastic element defines the other branch portion, said covering sleeve depending from said pair of elastic elements to define said leg portion.

14. A disposable diaper according to Claim 13 wherein said pair of elastic elements are arranged substantially parallel relative to each other.

15. A disposable diaper according to Claim 13 wherein said covering sleeve comprises a substantially liquid impermeable, air permeable fabric material for containing body waste within the diaper while permitting air circulation through said elastic gathers.

16. A disposable diaper according to Claim 12 wherein one of said elasticized branch portions includes a first elastic element and a cover sheet which envelops said elastic element and depends therefrom to define said leg portion in a manner such that a longitudinally extending primary

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containment region is defined between said leg portion and said top sheet of said diaper, and said other elasticized branch portion includes a second elastic element and a second cover sheet which envelops said second elastic element and is secured to said leg portion of said first branch portion in a manner such that a longitudinally extending secondary containment region is defined between said second cover sheet and said first branch portion.

17. A disposable diaper according to Claim 13 wherein one of said elastic elements is an elastic strand and the other of said elastic elements comprises a polyurethane elastic foam material.



FIG. 1

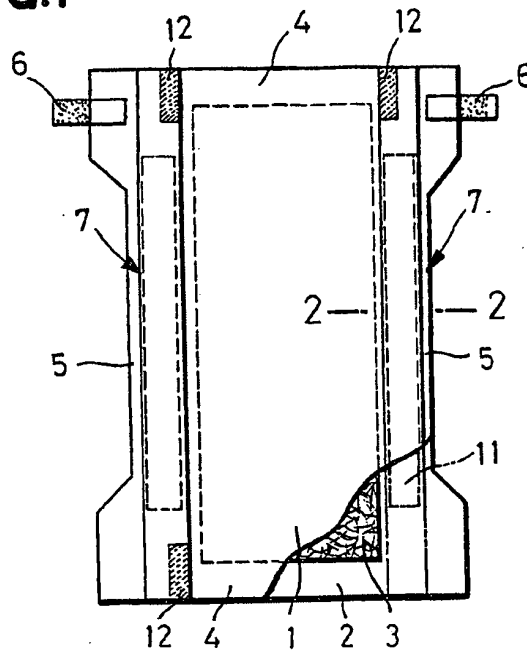


FIG. 2

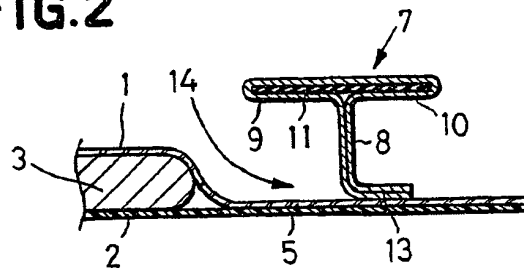


FIG. 3

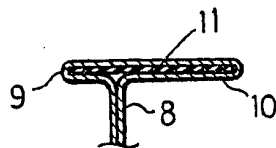
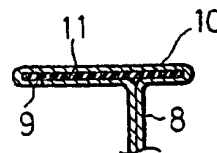


FIG. 4



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FIG. 5

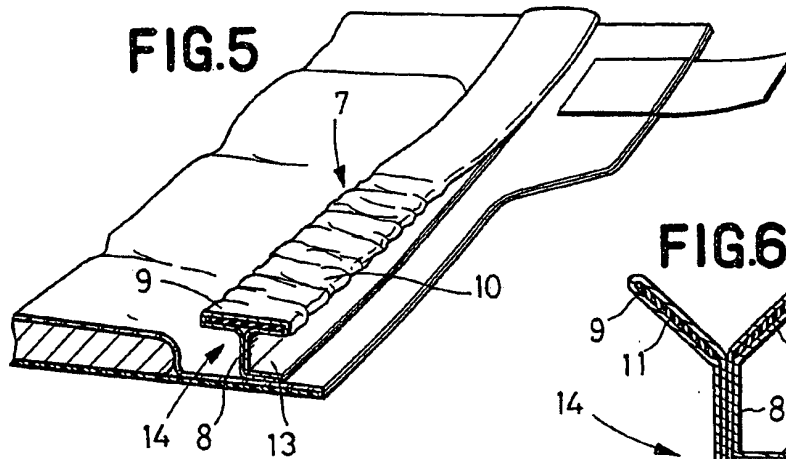


FIG. 6

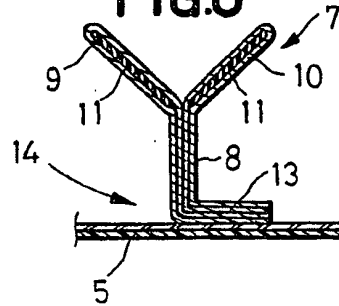


FIG. 9

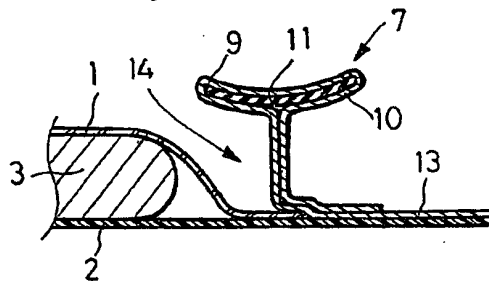


FIG. 7

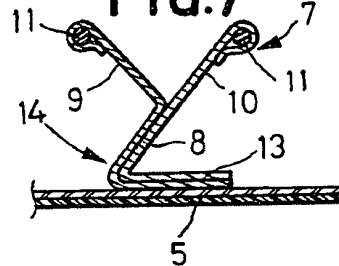


FIG. 10

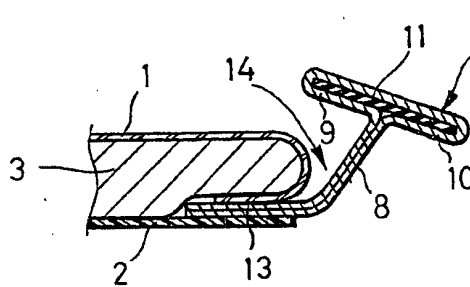
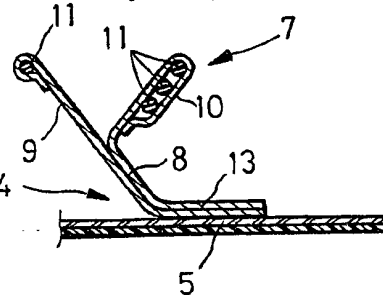


FIG. 8



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FIG. 11

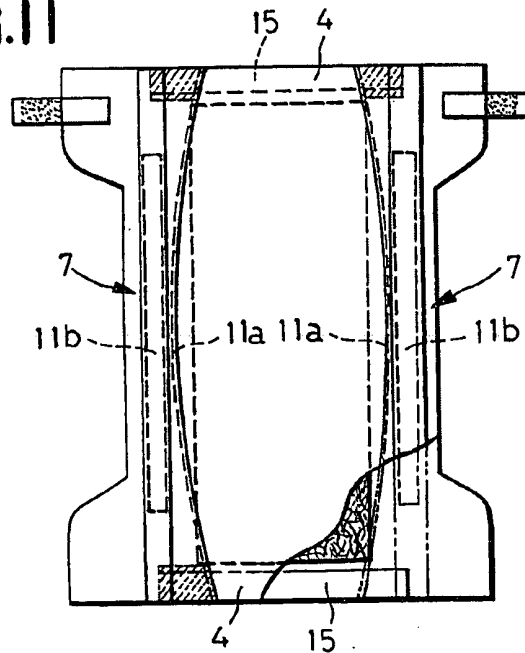
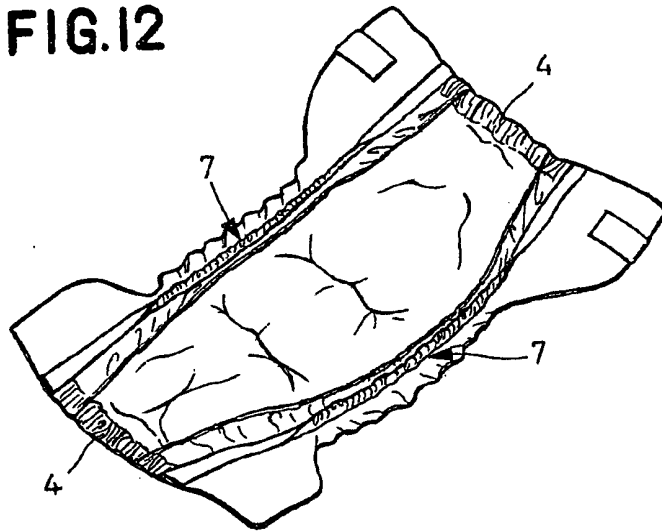


FIG. 12



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